

# Relapsing Fever— A Case History

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RELAPSING FEVER, a spirochetal disease transmitted by ticks, has been seen infrequently in California since the first clinical case was recorded in 1874.<sup>1</sup> Although the vector reservoir level remains high, the incidence of reported disease has decreased considerably, due possibly to treatment and cure of undiagnosed cases.

The present case is the only report of relapsing fever in California in 1967. Symptoms of a kind not hitherto reported occurred in both the patient and a friend of hers who had the same diagnosis.

## Report of a Case

A 12-year-old girl was seen in the office on 13 August (by LS) with complaints of dizziness, headache, abdominal pain associated with generalized cramping, and fever of 39.5° C (103.2° F). On physical examination, she was thought to have an enterovirus infection and treatment was symptomatic. Clinical disease cleared after four days. Five days later it recurred with fever 40.3° C (104.4° F) abdominal and low back pain, headache, circumoral pallor and clammy skin. The patient appeared acutely ill. She was ashen, with darkly circled and sunken eyes and a distant and somewhat pained look. She appeared to have lost weight. Previously an enthusiastic, charming girl, she was now quiet, listless and without luster in appearance or speech. Where before she had been consistently inquisitive, challenging, alert and mature, she was now distant, confused and tearful without provocation. There was no significant lymphadenopathy but the abdomen was tender, especially in the left and middle regions. Neither the spleen nor liver was enlarged and there was no

jaundice. There were no other significant physical findings and no tick bites were observed.

On this second visit, the patient said that she had been in the Lake Tahoe area staying in a cabin near Meeks Bay with a friend and her family. In the back of the cabin there was a high storage area which connected two rooms. The two girls had crawled through this passageway from one room to the other and had noted "rats" at the time. No one else in the family had entered this passageway. After returning home, the patient's friend was treated with tetracycline for tick bites and symptoms similar to those of our patient. Our patient had no known tick bites or evidence of ticks while at the summer cabin or at any time during her illness. Her friend's disease resolved itself without a confirmed diagnosis, although her physician had made a clinical diagnosis of relapsing fever.

Results of laboratory studies at this time included: old tuberculin negative at 1:1,000; hematocrit 37 mm; hemoglobin 12.3 gm per 100 ml; white blood cells 7,600 per cu mm with a differential of 1 percent eosinophils, 4 percent bands, 58 percent segmented cells, 34 percent lymphocytes (of which 4 percent were atypical) and 3 percent monocytes. Mean corpuscular hemoglobin concentration was 33 percent, and platelets appeared normal.

Uncorrected sedimentation rate was 46 mm in 1 hour. Results of urinalysis; of routine febrile agglutinations including *Salmonella typhi* O, *Salmonella typhi* H, paratyphi A, paratyphi B, *Brucella*, and tularemia; of heterophile agglutination; purified protein derivative skin test (intermediate strength); and viral studies were all negative. Viral isolation attempts were made for Q fever, typhus, Colorado tick fever, mumps, St. Louis encephalitis, western equine encephalitis, California encephalitis, and herpes simplex. All results were negative. Cerebrospinal fluid contained no cells or bacteria; glucose was 45 mg and protein 76 mg per 100 ml.

On 28 August the patient reported a new development—voices that seemed to be "screaming" in her ears, although she knew they were not really there. The voices were described as taunting, faint, and often indistinct. (Her friend had also described the same phenomenon.) She also had visual hallucinations of scenes going around in circles "like looking in a washing machine," which seemed quite real.

On 30 August she again had headache, abdom-

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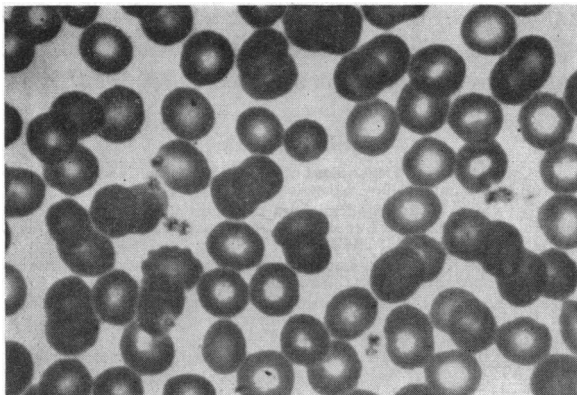


Figure 1.—Spirochete of relapsing fever (shown at center of field) on Wright stained smear of blood.

inal pain, chills and fever of 39.9° C (103.8° F). A blood smear was positive for spirochetes of relapsing fever (Figure 1). The spirochetes were observed in two separate smears (Wright stained). Penicillin was administered, 1,000,000 units intramuscularly in two doses. The patient became afebrile within eight hours after the first dose and had no further paroxysms, except that the auditory and visual hallucinations continued for six weeks with decreasing frequency.

She did poorly in school that semester, especially in reading, but when last seen had returned to her former excellent level.

## Discussion

The causative agent of relapsing fever is the spirochete *Borrelia duttonii*, first demonstrated in 1868 by Otto Obermeier.<sup>2</sup> Only 50 cases have been reported in the past 15 years in California, mostly from areas above 5,000 feet. The first cases in California were at Oroville in 1874 where several hundred cases were noted among Chinese laborers.<sup>1</sup> The first two cases proved by laboratory procedures in California were reported in 1921 by Briggs at San Francisco County Hospital. The patients had contracted the disease in the Lake Tahoe area.<sup>1</sup>

The vectors are ticks of the genus *ornithodoros*, species *hermii* or *parkeri*.<sup>3</sup> Once the tick becomes infected, it remains so for years and passes the spirochete congenitally without an intermediate host. Chipmunks and tamarack squirrels are the principal reservoirs. There is usually no history of known bites. They attack humans when their usual hosts (rodents) leave the area during season changes.<sup>4</sup>

Diagnosis can be made at the time of an acute

attack. Thick and thin smears prepared from fresh unstained defibrinated blood, mounted under a cover slip, are viewed under high-power lens. The spirochetes are about three times longer than a red cell diameter and they move vigorously. The organism may be difficult to find on a smear. (One smear in the case here reported was examined for 20 minutes before an organism was found.) Prolonged staining is helpful. Acid stains are best but Giemsa or Wright stains also work well.

The incubation period of the disease is two to 14 days (average seven) followed by onset of fever, dizziness, headache and generalized aching and chills. A macular rash which lasts two to five days may develop toward the end of the first paroxysm. Jaundice can occur and is occasionally pronounced. Attacks — as many as ten in some cases — recur at intervals of two to nine days; between attacks the patient is asymptomatic and afebrile. In untreated disease, recovery (in six to eight weeks) is related to antibody formation rather than phagocytosis; relapse is the result of ability of the organism to change antigenically.<sup>3</sup>

The spirochete injures all body tissue, particularly liver, spleen and kidney. During remission, spirochetes are present in splenic sinuses only, but during exacerbation they abound in peripheral blood. The disease may cause abortion in pregnant women and antibodies to it can be found in breast milk.<sup>5</sup> It is not communicable from one human to another.

Complications include facial paralysis, eye diseases such as iridocyclitis, vitreous opacities and optic atrophy, and possibly hypochromic anemia and leukocytosis.<sup>6</sup>

Prognosis is good even without treatment, although in African outbreaks fatality rates have been reported to be as high as 30 percent.<sup>7</sup>

Treatment with sulfonamides is ineffective; the drug of choice is probably terramycin, although penicillin may be equally effective. Antibiotic treatment should be started at the beginning of a paroxysm or after the fever has dropped, in order to avoid a "Jarisch-Herxheimer" reaction which can be dramatic and even fatal.<sup>8</sup> This reaction may be due to the liberation of leukocyte or endogenous pyrogen.<sup>9</sup> Some severely ill patients have died within hours of an intravenous dose of tetracycline or penicillin.

Two phases occur after treatment: an early pressor response (half to three hours after initial treatment) accompanied by a sharp rise in body

temperature, and a late phase with a fall and then a rise in central venous and systemic arterial pressures, due most probably to myocardial damage. Gallop rhythm and electrocardiographic changes can also occur.<sup>7</sup>

The disease must be differentiated from other febrile illness, particularly Weil's disease, typhus fever and atypical pneumonia. At the onset it can mimic a common viral infection, as it did in the present case.

### Summary

A case of relapsing fever in a 12-year-old girl who acquired it in the Lake Tahoe area of California is reported. Hallucinatory symptoms, not a frequent concomitant, were noted in addition to the usual symptoms. Diagnosis was made by ex-

amination of blood smears after three recurrences of symptoms in a two-week period. After treatment with penicillin, symptoms abated and did not recur.

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## COUNSELING TEEN-AGERS ABOUT DRUG USE

How do you counsel the teen-ager about drug abuse?

"I don't believe there is much difference between counseling a patient who is using drugs as a way of trying to solve an emotional problem, and counseling anyone else. I think, though, that the thing to do is to avoid focusing on the drug problem per se.

"It's unusual for a patient to come in complaining of having a 'drug problem.' Most patients come because they're having problems with depression, or poor concentration, or some kind of anxiety; and they don't mention the use of drugs, except in passing. I think it's important for the pediatrician to be as objective as possible about the drug situation when it comes up in the course of a counseling interview and not to become alarmed and begin moralizing on the subject or making threats about reporting the patient to his parents, or the police, or the school. Nor should he try to bludgeon the patient into promising to give up using drugs. I think that the pediatrician is better off if he presents the facts as he knows them, outlines the risks involved in using drugs, and then leaves it up to the patient to make the decision as to whether or not he stops using them. After that he should go quickly into a discussion of the psychological problems the patient has in the area of his school work, his relationship with his parents, his relationship with girl friends, and his difficulties in athletics. This is where the basic problem lies; and if the patient can resolve these problems, he is going to give up drugs spontaneously."

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